Caesar Rodney Institute
Center for Energy
Competitiveness
420 Corporate Blvd.
Newark, DE 19702

November 26, 2018

Via Delafile
Ms. Donna Nickerson, Secretary
Delaware Public Service Commission
861 Solver Lake Blvd.
Dover, DE 19904

RE: Application of Delmarva Power & Light Company for Approval of a Program for Plug In Electric Vehicle Charging filed October 17, 2017, Docket # 17-1094 – Rebuttal Testimony

Dear Secretary Nickerson:

On behalf of the Caesar Rodney Institute, enclosed for filing in the above referenced docket is the Rebuttal Testimony of David T. Stevenson. Courtesy copies are being provided to the Service List by electronic mail. A full copy of the report, "A Review of Gabel Associates, Inc., Benefit Cost Analysis for Electric Vehicle Adoption in the Delmarva Territory" is also attached.

Respectfully,

David T. Stevenson
Policy Director
Cell # 302-236-2050

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF DELAWARE

IN THE MATTER OF THE APPLICATION OF	)	
DELMARVA POWER & LIGHT COMPANY	)	PSC DOCKET NO. 17-1094
FOR APPROVAL OF A PROGRAM FOR	)	
PLUG IN VEHICLE CHARGING	)	
(Filed NOVEMBER 23, 2018)	)	

DIRECT TESTIMONY

OF

DAVID T. STEVENSON

ON BEHALF OF THE CAESAR RODNEY INSTITUTE

Q. **Please state your name and work address.**

A. My name is David T. Stevenson. My work address is 420 Corporate Blvd., Newark, DE 19702

Q. **What is your professional and education background?**

A. I am an economist (Bachelor of Science in Agricultural Economics from Rutgers University). I served on the Environmental Protection Agency Presidential Transition Team specifically as a result of Benefit Cost Analysis I completed for several proposed EPA regulations. I have worked in the field of energy and environmental policy as an analyst for the last seven years at the Caesar Rodney Institute, a state policy think tank completing numerous research papers including a peer reviewed paper published in the Cato Journal this year, and a peer reviewed study comparing economic growth in Delaware to the other forty-nine states. I have also consulted on technical and environmental issues for a dozen other state think tanks, and serve as a team member on the State Policy Network national Energy & Environmental Task Force. In 2018, I completed an economic analysis on refrigerant policy requested by President Trump's senior energy and environment policy advisor. I founded Alternative Strategies Consulting, and have been a consultant for the Delaware Public Advocate, an electricity distributor, and several large energy consuming companies. Previously, I led seven major business development projects at the DuPont Company and founded six businesses as an independent entrepreneur providing a strong perspective for balancing economic development and environmental regulation. I have been involved in numerous Public Service Commission dockets as an intervener and consultant, providing guidance on Solar Renewable Energy Credit auctions, electric grid resilience and reliability, electricity and natural gas pricing and service expansion, and electric supply strategies.

Q. Have you previously provided expert testimony before this commission?

A. Yes, I have testified for the Public Advocate on six dockets, and for the Caesar Rodney Institute on several occasions.

Q. What is the purpose of your testimony?

A. My purpose is to provide comments and recommendations on Delmarva Power & Light's application to invest in plug in electric vehicle (PIV) charging infrastructure, and to establish Time-of-Use rates. Specifically, my testimony will address the results of the Gabel Associates, Inc. report, "Benefit Cost Analysis for Electric Vehicle Adoption in the Delaware DPL Territory" (Gabel Report).

Q. **Please summarize your findings.**

A. The Gabel Report created a Benefit Cost Analysis (BCA) using widely accepted modeling principles. However, I have concerns with some key assumptions used in the Gabel Report. Delmarva's application consists of three very different topics: establishing Time-of-Use rates to encourage charging at off-peak times, subsidizing charging infrastructure investment at ratepayer expense, and subsidizing electric bus purchases at ratepayer expense. Gabel incorrectly conflates all three issues in a single BCA when each topic should be determined separately based on who benefits. The commission may be most interested in the BCA for just ratepayers who will not benefit directly from PIV subsidies. My study uses more recent, credible sources, such as U.S. government 2018 reports from the Energy Information Agency (EIA), the Census Agency, and the Environmental Protection Agency (EPA) to establish reasonable assumptions for future PIV fleet size, future battery cost reductions, and the value of externality benefits.

Using the federal historical and forecast sources resulted in cutting the 2035 estimate for PIV vehicle fleet size in more than half, the premium cost of PIVs in half with premiums continued through 2035 compared to the Gabel Report forecast the premium disappears by 2031. The Net Present Value of the benefits of avoided health and climate change from lower emissions dropped by 97 percent. I also assume federal and state PIV subsidies continue, and are a cost to Delaware ratepayers and taxpayers. These changes flip the BCA from a net benefit ratio to ratepayers of 1.5 times cost to a net cost ratio of 1.8 times benefits. Table 1 below reorganizes the BCA presented by the Gabel Report for just ratepayers, and shows results using a more conservative forecast.

Table 1: NPV (5.5% discount factor) Benefit Cost Analysis Comparison Delmarva PIV Plan

BCA for Non-PIV Owners in DPL Zone	**Gabel Report SCT - $millions**	**Conservative Case - $millions**
Avoided Wholesale Energy Benefit	$53.9	$25.4
Avoided Capacity/Transmission/Distribution Benefit	$116.4	$54.7
Avoided Emissions Benefit	$123.5	$3.5
Total Benefits	**$293.8**	**$83.5**
Direct Ratepayer Contribution Cost	$2.1	$2.1
Grid Reinforcement Cost	$56.1	$26.4
Non-Utility Charging Infrastructure	$137.8	$64.8
Federal;/State Tax Credits to PIV Owners Cost		$59.4
Total Cost	**$196.0**	**$151.6**

Q. Do the proposed Time-of-Use Rates, and charging infrastructure investments ensure more rapid growth of the PIV market?

A. No. The proposed application changes are unlikely to impact the overall PIV market. A barrier to PIV sales is range anxiety, the concern there will be nowhere to charge the battery if it runs out of charge. The Gabel Report states on page 29 the utility program "seeds the market", and leverages the proposed $2.2 million Delmarva investment into $297 million in matched investment by other parties. It is a huge stretch to assume Delmarva's direct investment of $892,000 in 114 charging stations, only four of which are public charging stations, is needed to

boost the PIV market in a meaningful way. DNREC's Kathleen Harris responded to Delaware Public Advocate (DPA) question 2, there are 37 public charging stations already in Delaware, so the Delmarva program would increase availability of public charging stations by only 11 percent. Further, the Gabel report estimates 5,565 public charging stations will be needed by 2035, and 140,737 residential charging stations. The Delmarva program would represent 0.07% of the charging stations in Delaware. According to the Delmarva application the Time-of-Use Rates will only save the average PIV owner $95 to $116 a year. The national PIV market will not be driven by incremental increases in subsidies in Delaware.

Q. What drives the difference between the Gabel Report and U.S Energy Information Agency fleet size, and PIV price premium forecasts?

A. The difference in PIV price premium, and fleet size forecasts is driven by different estimates of future battery costs. The Gabel Report assumes battery manufacturing economies of scale will wipe out the premium costs of PIVs by 2031. The EIA estimate assumes a slower drop in battery costs with the PIV price premium in 2035 still averaging about $10,000 a vehicle. Tesla has built the largest lithium ion battery manufacturing plant in the world which will double battery capacity worldwide, and claims it was producing at a 20 gigawatt-hour rate in mid-2018, about 30% of eventual capacity. However, Greentech Media reported Tesla raised the price of its Powerwall battery pack over 7% in April, 2018, suggesting battery costs are not dropping as a result of expanded production volume.

The continued price premium means federal and state subsidies will need to continue as well. There is a 0.88 correlation, an almost certain correlation, between the rate of PIV ownership, and the amount of money states have invested in subsidies. When states reduce subsidies PIV sales fall dramatically. For example, Georgia has the fifth highest PIV ownership rate, but annual sales fell 89 percent after a $5,000 PIV state grant ended even though the $7,500 federal Investment Tax Credit continued. The federal tax credit phases out after PIV model sales exceed 200,000 vehicles. The Tesla models, and the Chevrolet Bolt, together representing over 80 percent of PIV sales in February, 2018, according to the EV Obsession website, will no longer be eligible for the federal ITC sometime in 2019.

A lot of uncertainty surrounds the future cost of PIVs, and the continuation of government subsidies. That means the forecast of future sales is likewise highly uncertain.

Q. What drives the difference between the Gabel Report and EPA benefits of avoided health costs, and Social Cost of Carbon forecasts?

A. Beginning with Executive Order 13783 in March, 2017, the EPA has begun using much lower estimates of the benefits of avoided health costs, and the Social Cost of Carbon of lower emissions. The EPA provided updated cost estimates in both the repeal of the Clean Power Plan in October, 2017, and the proposed replacement, the Affordable Clean Energy Rule (ACE) in December, 2017. The Gabel Report uses out of date calculations for these values from 2015, and 2016. For perspective, the Gabel report uses an estimate of $55/ton for the Social Cost of Carbon. The ACE Rule uses $2 to $9/ton based on only calculating the value using domestic costs, and domestic benefits, and using both a 3 percent, and 7 percent discount rate as required by the U.S. Office of Management & Budget. The earlier estimate used global benefits versus domestic costs,

and used a 3 percent discount rate. The $2/ton estimate is a 96 percent reduction from the $55/ton estimate used in the Gabel Report.

Previously, avoided health benefits were only calculated using the assumption any exposure level caused health problems linearly down to zero exposure. In the most conservative case currently, the EPA assumes no health benefits for exposures below the rigorously established National Ambient Air Quality Standard. The change reduces potential benefits by 92 percent.

Combining the lower values with lower forecasted fleet sales results in a 97 percent reduction in the estimate of avoided emissions benefits.

Q. Is there a lifetime cost advantage of buying a PIV using current comparisons?

A. No. The current state of the PIV market is epitomized by the Chevrolet Bolt Battery Electric Vehicle with a 238 mile range, and the comparable internal combustion engine (ICE) Cruze compact hatchback. The Bolt costs $17,000 more, the buyer may invest another $1,300 in a home charger, and the Delaware Division of Motor Vehicles will charge an extra $765 Document Fee for a total initial cost differential of about $19,000. Over the expected 100,000 mile life of the Bolt battery pack the owner will save about $5,250 in fuel costs as electricity is cheaper than gasoline. However, our analysis indicates the difference in vehicle resale value wipes out the fuel savings, an issue the Gabel Report doesn't address. Also in our analysis other cost factors, such as, finance charges, maintenance, auto insurance, and fuel tax compensation are a wash. Bottom line, the Bolt will cost about $8,000 more over the 8 year, 100,000 mile life of the vehicle, including federal and state subsidies. The $19,000 initial cost premium for the Bolt means the carbon dioxide emission reduction may cost over $2,100 a ton. The latest auction price for a Regional Greenhouse Gas Initiative carbon dioxide emission allowance was $4.50/ton. Depending on PIVs for carbon dioxide emission benefits costs 469 times the RGGI program.

Q. Does the Delmarva plan to invest in electric buses at ratepayer expense make sense?

A. No. Delmarva plans to invest $400,000 in PIV buses. DNREC's Kathleen Harris responded in DPA-7 discovery question that DNREC has received $9.5 million as part of the Volkswagen Mitigation Trust Fund which can be used for electric buses. The Delmarva investment would be an un-needed duplication if the sole purpose is to gather information with a few buses. Gabel offers no bus specific BCA, and I calculate no offsetting benefits.

Q. Is the Delmarva plan needed to obtain experience with PIV charging patterns?

A. No. Delmarva sister companies Delmarva Power Maryland, and Baltimore Gas & Electric are already working under utility commission orders to gather the same information on a much larger population base, and six times the existing fleet of PIVs. Other utilities have also adopted plans similar to the Delmarva plan. Delmarva can obtain information on charging patterns elsewhere.

Q. What are your observations and recommendations for the Delmarva PIV application?

A. The costs are real and measureable. However the benefits are theoretical, not measureable, and ratepayers carry the risk if they do not materialize. To increase the confidence in the benefits, and to remove the risks for ratepayers, the following is recommended:

1) As the environmental externalities have such a high uncertainty they should be excluded from the BCA.
2) If Delmarva has confidence in the cost savings from increased non-peak electric demand, they should agree to a credit on electric bills for each PIV added to the fleet. If a third party such as PJM or EIA confirms the higher off peak demand is lowering electricity supply charges, then the credit would be zero.
3) The Gabel Report assumes there will be a mechanism to collect avoided fuel tax compensation from PIVs. Docket approval should be delayed until such a fee is legislated.

Using a conservative estimate for fleet size, future battery costs, and environmental benefits in a BCA indicates cost will exceed benefits for non-PIV owning ratepayers, and the ratepayers cover the risk of an even worse outcome if PIV sales collapse when federal and state subsidies end. The Delmarva PIV application does not meet the standard of "Just and Reasonable" and should be denied in total.

Q. Does this complete your testimony?

A. Yes.